



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SOCIETY OF ARTS.

FRIDAY, SEPTEMBER 23rd, 1853.

NEW ZEALAND FLAX.

THE following important communication has been received through the Colonial Department of Her Majesty's Government, in reply to the Circulars which were issued in the spring of 1852. It will be remembered that the object of those Circulars was to establish a correspondence with the various Societies situated in the British dependencies, with a view to obtaining correct information as to their natural resources and productions, and as to the state and condition of the different arts and manufactures; and that by making these known at home, commerce might be promoted, the arts improved, and manufactures extended. It is earnestly requested that any one who can assist in supplying the required information will have the goodness to communicate with the Secretary to the Society of Arts as soon as possible, that no time may be lost in putting the New Zealand Society in possession of the details desired.

Wellington, New Zealand,
24th January, 1853.

SIR,—The Council of the New Zealand Society having received through their President, His Excellency Sir George Grey, your circular, His Excellency Nos. 1 and 2, of the 26th of March, 1852, addressed to Her Majesty's Principal Secretary of State for the Colonies, have instructed me to acknowledge the same, and to express their highest appreciation of the objects proposed therein, as well as of the obligation under which they are laid to the Society of Arts for a scheme so likely to result in the benefit of this and all the colonies of the British empire; nor can they doubt its ultimate success, when they assure themselves of the reality of the interest which is taken by that Society in all matters relating to colonial produce and industry. They also gladly avail themselves of this opportunity of expressing their warmest congratulations upon the distinguished honour you have obtained in having originated through your Royal President, and fostered by your exertions, the great Exhibition of 1851; a wonder which will never be forgotten, and the immediate successes and results of which are but pledges of what the ultimate results cannot fail to be.

In availing ourselves of the advantages proposed by your circular, I herewith subjoin a statement of the objects contemplated by the New Zealand Society, in which you will perceive that the development of the resources and capabilities of the colony ranks amongst the first. Its objects are—1st. The development of the

physical character of the New Zealand group; its natural history, resources, and capabilities. 2nd. The collection and preservation of materials illustrative of the history of its native inhabitants, their language, customs, poetry, and traditions. 3rd. The publication of such papers, on these and other subjects, as may be deemed by the Council of sufficient importance. 4th. The formation of a standard library and museum. 5th. The establishment in the sister settlements of corresponding Societies in furtherance of the above objects.

The Society proposes from time to time, as opportunities occur, to communicate with you on the above subjects, taken in connexion with the objects mentioned in your circular.

Referring now more particularly to the Enclosure No. 2 forwarded with that circular, I may assume, from the communications forwarded from here to the Commissioners of the Exhibition of 1851, that you are already in possession of the requisite information as to the products of this colony, viz., flax, wool, oil, whalebone, timber, gum, copper, iron-sand, sulphur, coal, &c., &c., particulars in detail of all of which I hope hereafter to forward to you in relation to commercial enterprise.

The Council have instructed me now to lay before you the particulars of our most abundant and important product, and to solicit the aid offered by you under the third division of that Enclosure, which offers to afford such information as we may require in regard to implements, machinery, or chemical or other processes necessary to the prosecution of any special branch of industry.

The Phormium Tenax, or New Zealand flax, grows in great luxuriance in every part of the islands of New Zealand; its qualities have long been known to the Colonists, and it has been in use among the natives from time immemorial: it has also been for twenty years an article of commerce, but in small quantities, being only that which has been prepared by the natives and sold to trading vessels which have collected it along the coasts. The flax is contained in the leaf of the plant, and is covered by a thick green cuticle. Before the fibre can be obtained, the leaf requires to be decorticated; and a viscous, gummy substance removed, the precise nature of which is as yet unascertained. Hitherto this cleansing has been rather imperfectly accomplished, or at such a cost of labour as to render the article unsaleable at a remunerating price. The principal processes which have been successively employed are Hand-scraping, Machine-dressing, and the Application of Solvents. The first, or *Hand-scraping*, is the only mode that is or has been attempted by the natives. Sitting down and holding the leaf in his left hand, and a sharp-edged shell in his right, the native lays the leaf across his knee, makes an incision across the cuticle, about the middle of the length, and by drawing the leaf under the shell, takes off the cuticle from the incision he has made to the end of the leaf, which he then turns round and repeats, and so concludes the process: scraping more or less according to the fine less he wishes to produce. Second: *Machine-dressing*.—Since the European colonization of New Zealand, various machines have been devised, & me

of which possess considerable ingenuity, for the purpose of cleaning the fibre. Some of these have been for scraping, others for beating, or stamping it in troughs of running water, and others by steeping and then beating; but up to the present time all have been too costly, and they have all had this disadvantage, that the gum still remained, rendering the fibre intractable and brittle. Thirdly: *The Application of Solvents*.—Attention was then directed to find, if possible, a solvent for the gum; and after many and long-continued experiments, it has been satisfactorily shown that boiling the leaf in clear water is sufficient; but a new difficulty remains. After boiling, the leaf requires washing, as a laundress does linen, by rubbing between the hands, which frees it altogether from the gum, but so increases the expense as to preclude the flax from becoming an article of commerce.

These being facts patent to all persons here, who see almost the whole country covered with this valuable plant, and scarcely any use made of it, the Council of the New Zealand Society have been anxiously considering the subject from their earliest meeting, and have long had in contemplation the offering of a Premium for useful suggestions or machines. Difficulties of various kinds have hitherto prevented this; but they now eagerly embrace the opportunity you have afforded them to secure your valuable aid and co-operation. With a view to this they now take the liberty to ship to your address a ton (1 ton) of coarsely-dressed flax,* in order that any person who may be desirous of trying experiments may have material to work upon: at the same time I would remind you that the plant is growing in various places in England, and amongst others I believe at Kew and Chatsworth.

I am further desired to state that the Council are willing to award a Premium of Fifty (50) Guineas to any person who will furnish them with modes of operation, and models, and specifications of machinery, by which the flax may be dressed at a cost not exceeding 5*l.* per ton,† reckoning the wages of an ordinary labourer at 4*s.* per diem, and of artisans at 6*s.* to 6*s.* 6*d.* The machine to be of two kinds; one analogous to the old spinning-wheel, that may be used in every cottage or shepherd's hut, and the other suitable for more extensive operations.

In requesting you to interest yourselves in this matter for us, I am aware we are imposing upon you an onerous task; but as it is of the precise nature of the objects you propose, and as we greatly desire and need the information for which we ask, we can only hope that you will be as successful in its development as your universal renown leads us to expect; and that it may prove to be an additional and important instance of the extended usefulness of your Society; and that the time may not be very far distant when the Navy and the Mercantile Marine of Great Britain will be supplied with cordage and sails from the hitherto comparatively useless New Zealand Flax.

I am, &c.,
EDWARD ROBERTS, *Hon. Secretary.*

* This has not yet arrived; immediate notice of its receipt will be given in the Journal.—*Sec. Society of Arts.*

† This price is to prepare the flax as a raw material.

ANNUAL EXHIBITION OF INVENTIONS.

THE attention of Members, Manufacturers, Patentees, and others, is particularly requested to the subjoined circular relative to the forthcoming Exhibition of Inventions:

Society of Arts, Manufactures, and Commerce,
Adelphi, London. September, 1853.

SIR,—I am desired to inform you that the Council of the Society of Arts has resolved to open, on the first Wednesday in November next, their Sixth Annual Exhibition of Recent Inventions, whether patented, registered, or not, and I beg to ask if you wish to exhibit on that occasion any model or specimen of your recent inventions or improvements.

The object of the Society in holding these exhibitions is to stimulate and encourage invention, and show the progress of industry during the past year, by placing the works and efforts of ingenious minds prominently before the public. These exhibitions have been visited annually by large numbers of persons, they are open free, and no charge whatever is made for space.

Should you be disposed to send models or specimens for exhibition, I shall feel obliged by your filling in the enclosed form, and returning it to me as speedily as possible. All articles intended for exhibition must be accompanied with a short description for insertion in the Catalogue, and must be delivered, carriage paid, at the Society's House, John-street, Adelphi, on or before the 15th of October next.

I am, Sir,

Your obedient servant,
P. LE NEVE FOSTER, *Secretary.*

The following is the form referred to, copies of which may be had on application:

Title of Invention	
Name and Address of Exhibitor..	
Description of Article to be sent,	
whether Model, Drawing, or	
Specimen	
Space which Article to be sent	
will occupy on a floor or counter	

SUGGESTIONS FOR THE CONVERSION OF MECHANICS' INSTITUTIONS INTO COLLEGES FOR THE PEOPLE.*

BY HUGO REID.

Formerly of the Glasgow and Liverpool Mechanics' Institutions.

1.—All education is *imperfect* that is stopped before the age of from eighteen to twenty years, the time when the mind attains its natural maturity.

2.—At about fourteen or fifteen years of age, the mind *begins* to pass from being light, trifling, feeble, shallow, contracted, as in the child or boy, to being solid, serious, energetic, deep, and capable of a wide range of action, exhibiting in some degree the features which distinguish the man; the character is beginning to take a set, and acquire a rigidity which now increases rapidly; the three or four years following that period are the most precious for the work of the educator; and that educa-

* The substance of this paper was delivered as a lecture in Nottingham in December, 1851; parts of it were brought forward some years since by the author in an article in *Tail's Magazine*. The recent attempts of Mechanics' Institutions to organize themselves into a connected body, and of the Society of Arts to aid and stimulate them, seem to make the present a favourable time for drawing attention to plans for rendering these Institutions more serviceable in extending and improving education amongst the middle and working classes.

tion must be considered as *exceedingly imperfect* indeed—in fact, as being nipped in the bud—that is not carried on to about eighteen years of age.

3.—A considerable amount of miscellaneous information, skill in some handicraft arts, as writing and drawing, or in certain intellectual arts, as arithmetic, mensuration, reading, and speaking various languages, depending on memory and imitation, may be acquired previous to fourteen years of age.

4.—All this, however, is but a small part of real intellectual education. It is *instruction* only, and that of an incomplete character. *Intellectual training*—meaning thereby the imparting of systematised knowledge thoroughly understood in its proofs, and in the various relations of its parts; the adequate exercise of the higher faculties of discriminating observation, invention, and reasoning in all its varieties; the cultivation of the capacity and disposition for intellectual action, so that a *self-educating* habit may be formed; and the implanting that knowledge and those tastes and powers which will enrich, refine, and elevate the mind, and furnish the means of harmless and rational enjoyments for leisure hours in after-life—this kind of training can scarcely be entered upon before fourteen or fifteen years of age, and the individual must be deprived of it altogether, if his education is cut short at that period.

5.—There is urgent need for extending the period of education to the utmost, from the vast amount of knowledge, bearing closely on our welfare, which has been gathered together since the time of Galileo and Bacon, and especially that, so rich in practical results, accumulated during the last hundred years. Some knowledge of the general principles, leading facts, and more important applications of science is now necessary to constitute an intelligent member of even the humbler ranks of society.

6.—Now, the great mass of the youth of this country are taken from school and sent to business at about fourteen or fifteen years of age (many even earlier); there is no provision for continuing their education during the critical years that follow; it is stopped when just beginning to ripen into fruit; the crowning work is left undone; the character, while acquiring its fixed and permanent form, is deprived of directing influences, and exposed to a crowd of vicious influences, or left to its own blind and imperfect guidance, and the result is, an inferior race, with minds but half-informed and half-cultivated.

7.—This is a crying evil; the individual suffers from it, and society suffers from it. There is a want of some public recognition of the important truth that that education which is ended at fourteen or fifteen years of age is incomplete, and totally inadequate for the proper ends of education. An advanced course of study for those who have gone to business, with the hours and courses expressly suited to their engagements, is a *great educational want*. The public establishment in every town or district of such a course would at once proclaim the principle aloud, and furnish the means of putting it into practice; after it had been established a few years, instead of the *greater part* of our youth spending their leisure time in useless or frivolous pursuits, and a *few* devoting their spare time to self-improvement, and that imperfectly from want of proper direction and opportunities, the proportions would be reversed; the majority would take steps to *truly complete* their education; those who did not, would violate an acknowledged principle and established practice—they would be the exceptions, and would form a rapidly decreasing minority.

8.—The Mechanics' Institution may be formed into a

true College for the People, to provide them with such a course, to complete the great work of education.

9.—It does not do so at present.

10.—There is no systematic course laid down, extending over two or three years, and including the leading branches of useful knowledge; there are often no private classes, which should accompany every course of lectures for the more thorough instruction of those who desire to study earnestly; the courses of lectures are too short and in too light and superficial a style to impart solid instruction;—at once *too advanced*, in not going systematically through the elementary parts of the subject, and *too superficial*, in skimming only the leading and attractive features. They are not enough for mental training; something more serious, more solid, more invigorating, more dry and hard, is indispensable, if we wish to impart substantial information, and develop mental power. Such lectures and similar reading are even injurious to a youth at the critical period when the mind should be trained to earnest study, vigorous action, and searching below the surface of things. He forms habits of looking only for amusement or excitement, of studying in a light and careless way, of shrinking from difficulties, of being easily satisfied with such facts and reasonings as are presented to him, of not using the higher powers of his mind; in fact, from not being called forth and exercised, he never acquires the use of these higher powers, never even learns fully the subjects in which he is interested, and remains, mentally, but a half-formed being.

11.—The great educational want here indicated cannot be supplied but by a systematic course of education under a competent instructor and guide, which implies a regular succession of studies entered upon as a serious and earnest work, pursued to their depths and mastered, regular times set apart for the purpose, lessons prepared, and examination—or, at the least, free conversation, with the instructor on the subject of study; one subject completed, and another taken up in order, and so on methodically till the complete course has been gone through.

12.—The Mechanics' Institution may be made to do this without any interference with the purposes to which many of them have been turned—that of supplying rational recreation and innocent amusement. In so far as they do that well, they are highly useful, and succeed in supplying a great want, too little thought of in this country of hard-working, pushing, keen accumulators of wealth.

13.—But the Mechanics' Institution may do much more than this. It has already a "local habitation and a name;" it has lecture-rooms and class-rooms, an organization capable of easy application, to open up and cultivate any new educational field; weight and influence, to make known and recommend any useful extension of its plans; and it is everywhere. These means and appliances are too valuable and too difficult to be raised up anew to be confined to merely providing entertainment. One more effort, and that for a great and worthy end, and the Mechanics' Institution may become a real PEOPLE'S COLLEGE in the only proper sense of the word.

COLLEGIATE COURSE FOR MECHANICS' INSTITUTIONS.

14.—Let every Institution, which may be fixed on as the centre of a sufficient district, establish a *course of lectures* on the leading branches of useful knowledge, to be given *once a week* in each year from the beginning of September to the end of April, making about thirty-four lectures, and extending over *four years*; so that the student who attends during that time shall have a com-

plete survey of the principal divisions of human knowledge. Let each year's course be complete in itself, so that a beginning may be made by the student in any year, the other courses following in due order; but one order of succession must always be preferable.

15.—Connected with the lectures, and going on at the same time, let there be *private classes*, in which the lecturer meets from ten to fifteen of his students for conversation, more extended explanation, hearing lessons, and examining exercises, all on the subject of the lectures; so that, while the latter give a solid and tolerably complete body of information, and will instruct sufficiently those who attend regularly, more minute and thorough instruction and mental training shall be within the reach of those who may desire it.

16.—There are many different ways in which the subjects may be arranged: the following is suggested as one that might, perhaps, be found convenient. Besides those given below, which form the systematic course, there might be occasional short courses on special departments of some important subject; but those now to be mentioned present a complete body of the rudiments of useful knowledge:

First Year.	Lectures.	Second Year.	Lectures.
Language	10	Natural Philosophy	24
Arithmetic and Algebra ...	12	Botany	5
Geometry	12	Zoology	5
	34		34
Third Year.	Lectures.	Fourth Year.	Lectures.
Chemistry	22	Mental Philosophy	12
Human Physiology	5	Political Philosophy	11
Physical Geography	7	Geology	11
	34		34

Some such *curriculum* is essential. The youth who is ever so desirous to improve himself, does not know what course to pursue. His parents do not know. His college, the Mechanics' Institution, does not point out the way. He rambles about from one study to another, like a person groping in the dark, frittering away his time and faculties at a variety of merely popular lectures and desultory reading, is soon tired of the unsatisfactory results of his attempts in pursuit of knowledge, gives them up in despair, and joins the crowd of triflers.

17.—Let a diploma, or certificate, be given to those who pass an examination on the subjects of the complete course, or even for proficiency in certain subjects only—the necessary instruction for passing the examination being given in the lectures and private classes. But it is not necessary, nor liberal, to restrict this diploma to those who have attended these courses; it should be given freely to all who are able and willing to pass the examination and pay the fees, however or wherever their knowledge has been acquired.

18.—If a sufficient number come forward, the lecturer might be going on with two of the courses, or even three, during one session—the same course repeated to a different class, or otherwise.

19.—Many would attend some particular course twice, as well as some of the special or extra courses that should be given from time to time. With these, and the four years' course, it should be considered that each student ought to be pursuing his education systematically from fifteen to twenty-one years of age.

20.—By regular attendance on the lectures, with occasional reading, each student would acquire a tolerable amount of exact information in the leading departments of useful knowledge, and have his mind led into trains of solid thinking by the various reasonings brought under his notice. This would not occupy him more than

about two hours weekly for eight months of four successive years; while, both morally and intellectually, he would derive great advantage from this steady continuous application to study during these critical years. Those who desired more thorough instruction and training would attend also the private classes one hour weekly; which, with one hour's special preparation for the private class, and the two hours already mentioned, would amount to four hours weekly. Besides the private classes attached to the lectures, there should be others, for still more extended private instruction, on the plan carried out so efficiently in the evening schools of the Liverpool and a few other Mechanics' Institutions.

21.—The lectureships might be variously divided—Language, Mental Philosophy, Political Philosophy, Human Physiology, and Physical Geography might be conjoined—the others being in the hands of one lecturer. Or a three-fold arrangement might be adopted.

22.—There should be lectures and private classes in the evening, to suit the arrangements of those engaged in business during the day; but that need not prevent courses of both being given during the day, which might be preferred by females, to whom all the courses should be open.

23.—The desirableness of some such scheme, to enable those who are sent early to business to complete their education, and to aid in rescuing them from frivolity or vice, and from allowing their minds to run to waste, will probably be conceded. But doubts may be raised as to its practicability.

24.—The chief obstacles to the execution of such a plan seem to be the want of funds to carry it out; the interference of business engagements, arising from the long hours of employment; and the exhaustion of the system in the evening, arising from the same cause.

25.—It is not to be expected that such a scheme can be set a-going in any locality, with the slightest prospect of success, without very great efforts at first to give it publicity, to explain and recommend it, to procure for it the public sanction of the most influential and respected names in the district, particularly of parents, guardians, employers, and any others known to have the care of young persons in whose welfare they are interested. If the plan is of any value at all, it must be worth one great effort at introducing it.

26.—Every Mechanics' Institution is provided with a lecture-room, and most of them with smaller rooms (both unoccupied during the greater part of the week), that could be used for private classes; but the latter could be held anywhere, even at the house of the lecturer, or some of the pupils.

27.—If a lecturer gives three lectures weekly to a class of about 150 each evening, at a fee of 10s. from each student, here is an income of 225*l.*, besides the fees from the private classes. After the system had been in operation some time, this might reasonably be looked for, either in one populous district, or by lecturing in adjacent districts. But this cannot be expected at first.

28.—About a tenth of the population are of the age of from fifteen to twenty-one years. In a district with a population of 100,000, this gives 10,000 who should thus be engaged in completing their education. If we suppose that, by extraordinary efforts, one in twenty-five out of the 10,000 could be induced to attend the proposed course, at a payment of 10s. yearly, this gives at once a class of 400, and an income of 200*l.* If of these, one in four (100) attends a private class, also at 10s. each, we have 50*l.* more; making in all 250*l.*, which would be a good beginning for one lecturer. If it were found

necessary to begin with two lecturers (and there would be great advantage in beginning it in a thoroughly efficient style), there would be 125*l.* for each; and surely the subscriptions of the district (and perhaps a little Government aid) might be procured to the extent of 150*l.* more for a year or two; making a yearly salary of 200*l.* for each lecturer, which he could perhaps raise a little by other private classes and occasional special courses. Or each might lecture in two or more adjacent districts, and thus, with less extraneous aid, render his situation remunerative. But the plan might be begun with only one lecturer, and gradually extended as its advantages became better known and appreciated.

29.—It would be well worth while for the inhabitants of any district to subscribe liberally to have the education of their youth thus completed, their time occupied rationally, their attention turned to intellectual and refined pursuits. There seems little reason to doubt that if started with spirit, and supported liberally for a few years, the system would soon become self-supporting, even though commencing still less favourably than is assumed above, which would probably be the case in many districts.

30.—Early closing is now becoming general, and would be still more so when its energetic and able advocates could point to so urgent a reason for spare time being allowed to the young in the evenings,—to the improved opportunities of employing that time. This has been rather a weak point hitherto with the advocates of short hours of labour; as, though time to the young for self-improvement was always admitted in a general way to be most desirable, there was no systematic provision for regular and useful employment of that time, no authoritatively sanctioned plan for the purpose, nor any distinct view of how it should be occupied; so that many, parents as well as employers, thought that it would be as well for their youth to be kept engaged at business.

31.—Such is a brief outline of a scheme for increasing the usefulness of Mechanics' Institutions, respectfully submitted to their consideration by one who has now been associated with such Institutions for a period of about twenty years.*

INTERNATIONAL POSTAGE.

At a Meeting of the Council of the International Postage Association, held at the Society of Arts, on the 15th inst., it was resolved, to appoint Colonel Sykes, and Don Manuel de Ysasi (the Honorary Secretary), special Commissioners to attend the International and Statistical Congress now being held at Brussels, under the presidency of Monsieur L. A. J. Quetelet. In a communication to that gentleman, the Council say, that "the experiment of cheap postage, with prepayment by stamp, has been tried in many countries, and always with complete success. In the case of Great Britain the gross revenue from the Post-office in 1840 (the first year of the penny-postage), was 1,359,466*l.*, whilst in 1851, it amounted to 2,422,168*l.*, being an increase of very nearly 100,000*l.* sterling a year, and a larger total by some thousands than had ever before been obtained in one year from postage. The commercial and social effects of cheap postage cannot be so clearly shown as the financial, but some idea of them may be derived from the fact, that the increase of letters passing through the

post-office for the year 1852, taken in comparison with the year 1838, was upwards of 304 millions, being more than fivefold. The Association has already obtained from the British Government, as an acknowledgment of the correctness of its principles of action, its declared intention of reducing to a moderate and uniform rate the system of postage between the mother country and the whole of its colonies. The absolute necessity for some systematic arrangement of international postage, and especially some provision for the transit of mails through intervening countries, is strikingly shown by the fact that, at the present time, one-half of the civilised world has no direct communication with the other half. The Association does not presume to dictate, or even suggest to foreign powers what they shall charge for postage, but it submits for consideration the following resolutions, as the basis of a general postal convention: First, That each country becoming a party to the convention shall charge, collect, and retain the entire postage of all foreign letters sent outwards; and that it shall deliver all letters received from foreign post-offices included in the convention free of all charge whatever. Secondly, That each country shall make what charge it pleases on all letters proceeding to foreign countries, but that charge shall be uniform in all things to all countries parties to the convention. Thirdly, We also wish particularly to call your attention to the consideration of some plan by which the transmission of mails through intervening countries, parties to the convention, may be arranged."

OCEANIC TELEGRAPH LINE BETWEEN EUROPE AND AMERICA.

(From the *Daily News*)

We have it stated to us, says the Bangor *State of Maine*, on the authority of Mr. Robert Stephenson, the eminent engineer, that a recent discovery in telegraphing has been made which may work as great a revolution in the world of letters and of commerce as has been already effected by the original application of electricity or electro-magnetism to the purpose of telegraphic communication, or, in other words, the art of writing at a distance.

To make ourselves understood, it may be proper to say, that heretofore the most scientific observers of facts in electro-magnetism have supposed that there was a limit to the force or strength of the magnetic current upon any given circuit, and that, however perfect might be the insulation of the submarine wire, the blow or shock could not be sent across the Atlantic Ocean. In this belief a project has been formed for constructing a submarine telegraph between Great Britain and the United States by a circuitous route across the various straits and channels lying between the intermediate islands of the Northern Atlantic Ocean. It was proposed to commence this line at the northerly part of Scotland, thence to the Orkneys, thence to the Shetland and Faroe Islands, thence to Iceland, a distance of some 300 miles; thence to the shores of Greenland, thence across land to Davis's Strait, thence across the said strait to the Labrador shore, thence by land to Quebec, &c.

Mr. Stephenson states that a series of recent experiments has established the fact that by forming a complete wire circuit, that is, by two connected wires extended so as to return to the same point of departure, forming a complete metallic circuit, instead of using one wire connected with the ground, the galvanic current may be sent to any conceivable distance without loss or diminution of power. The supposed weakness of the

* Mr. Hugo Reid has had this letter set up in a separate form, with some explanatory notes, and has kindly furnished the Society with copies for distribution to the Institutions in Union: these will be forwarded in the next book-parcel.—*Sec. Soc. of Arts.*

current is to be attributed to its interruption by cross currents, which cross currents are overcome or avoided by the continuous wire circuit.

In this way, doubling the expense of the submarine cable, making with it a complete metallic circuit, or double track, by a return line, the galvanic current may be sent, without sensible loss of power, from London to Portland or New York, or at any rate from Galway to Cape Race.

It is known, however, that this principle of a metallic circuit was one of the first ideas in the telegraph; but a subsequent discovery of the fact that one line of wire inserted in the earth made a complete circuit by this means alone, caused the original method to be laid aside, and finally abandoned.

We cannot any longer doubt that the Oceanic Telegraph will be realised, and that a line of wires will yet encircle the whole earth, bringing all parts of it into instantaneous communication with each other. It is impossible for any human foresight to estimate or predict even the results of such a communication; and we trust that the Governments of the United States and Great Britain will take up the matter of an oceanic line on a scale commensurate with its importance—providing such a number of distinct wires, inclosed in one cable, as will supply the necessities of commerce and intercourse between Europe and America.

DRAWING INSTRUMENTS.

At a time when the camera is attracting so much attention, and photographic images are by its means being produced in almost endless variety, we are too apt to overlook any other mechanical or optical arrangements calculated to facilitate the production of correct representations of objects in nature or art. We would direct attention to the Graphic Telescope, an instrument invented by Mr. Varley, which, although not new, is far too little known, as it affords almost unlimited aid to artists, architects, and draughtsmen. It presents to the eye correct images of any object which it may be desirable to trace, from any direction, and of any size we need. At whatever distance from the eye it may be eligible to place the paper, the images can be placed by which means the image and pencil are made to coincide so truly that both are distinctly seen together, and from this exact coincidence both eyes remain open to see the pencil, though a portion of one only sees the image. By its means also images may be reversed when necessary for lithographic purposes. In the Graphic Telescope the field of view is large, being about as wide as the paper is distant from the eye; and the picture or image may be extended every way by moving the telescope and shifting the paper, there being means of correction when needed. In its use, with a variety of power, we have unlimited choice as to the size of the images we intend to trace, and they may be drawn to the true perspective distance of the picture in which they are to be used. The telescope is peculiar, and differs from all others, it being constructed expressly for this purpose, to be capable of having the lowest powers as well as the highest, and with a large field of view. It may be described as a telescope between two reflecting speculums, by which an erect image is obtained clear of the telescope. The drawing surface may be placed in the most convenient position, either level or sloping, and the instrument can take images from every possible direction. Thus pictures or ornaments on a ceiling may be as easily traced as those in any other position. Mr. Horner, by means of the Graphic Te-

lescope, produced one of the largest panoramas ever painted,—London as seen from the top of St. Paul's,—a task almost hopeless without such aid. To be able to trace a telescopic image, absolute steadiness, as well as lightness, is required, so as to afford facilities of transit from place to place; these the arrangements of the Graphic Telescope have effected; it is the lightest and steadiest instrument that has been provided for such purposes. The whole framing forms a series of triangles so opposed to each other as to produce the required stiffness by construction, and not by weight. The telescope, when prepared for use, is placed on a pyramidal stand, forming a stiff base, and holding it steadily over a table. Not only may portraits, animals, sculpture, shipping, and buildings, be correctly traced, but they may be drawn to an exact scale without measurement. Thus a most useful tool is provided for artists, by which valuable time may be saved, and correct sketches made of all difficult subjects. It will also frequently find views of places too distant to be regarded by the unassisted eye.

HOME CORRESPONDENCE.

PATENTS.

SIR,—The summary of Mr. Denison's argument, if I understand it rightly, is this: "that the world would be none the worse for the total abolition of Patent laws." This conclusion he rests mainly upon the supposition that in the absence of any "encouragement" to inventors, useful inventions would be just as plentiful as they are now, inasmuch as invention is a natural faculty of the human mind, and not the offspring of any legislative enactment.

Now it seems to me, that plausible as this appears, there is a fallacy at the root of it. It is true that the inventive faculty is natural to some minds, and that it would be so without as well as with Patent-laws; but does this prove that inventions would be brought into use without some special advantage to their inventors? Mere invention, that is to say the idea of a thing, however good, is of small value,—it is the practical development of the idea that is really valuable; and it is therefore a fallacy to say that the world would not lose by the abolition of Patent-laws, because they do not increase the number of "inventions." Perhaps Mr. Denison thinks that a good invention will of necessity work its own way. This is contrary to general experience. Mechanical, or, perhaps, I should say physical, truth travels not more rapidly than moral truth,—unless it be pressed forward by some energetic personal agency, it is apt to lie long "*in petto*," and stands good chance of oblivion.

For the sake of meeting Mr. Denison upon his own ground—that of *expediency*, I will pass by the "natural right" question, only remarking, that believing as I do that, as Sterne coarsely phrases it, "a man has as much right to the exudations of his brains, as to the breeches upon his backside," I cannot see the *justice* of an argument which seeks to deprive the inventor of any benefit from his own inventions beyond that which he may derive from the general progress of society consequent upon the use of them. Even if the inventor's "natural right" could not be proved argumentatively, I would still rest upon that innate sense of right and justice which fortunately for humanity sometimes transcends all merely logical deductions.

The infinitely lower question of *expediency* is a fairer subject for argument. Unless it can be established as the duty of every one to contribute all his possessions

and knowledge to the common stock of society, — to argue in favour of the spoliation of individuals for the advantage of the community, is an offence against the fundamental principles of social morality.

Before I proceed farther, I wish to remark, that much of the difficulty of this discussion arises, as it so often does in arguments, from the too general use of terms. The term "invention" is one of very wide signification. Setting aside its literary uses, as being beside the present question, it includes many ideas in its application to *things*. The invention of machines, of compounds, and of processes, are so many distinct manifestations of the inventive faculty, and it is no fair argument against Patent-laws (viewing them as encouragements to invention), to assert that any *one* of these manifestations would not be injuriously affected by the absence of "encouragement." The scientific chemist must not be played off against the mechanist, nor the improving manufacturer against the amateur or the man of science, just as it may happen to meet the exigencies of an argument. In what I have to say, I shall use the term "invention" as signifying *the practical application of new and useful ideas to material things*; by the term "inventor," I mean one who so applies ideas (not the mere idealist), and by "Patent-laws," I shall understand any Legislative enactment in favour of such an inventor.

The question to which I now address myself is, "Whether or not it is *expedient* that society should give legislative encouragement to inventors?" I maintain the affirmative. Firstly, because society thereby obtains the benefit of inventions that would not otherwise be brought into use. Secondly, because it obtains the use of good inventions *sooner* than it would do in the absence of encouragement to inventors. If I am successful in proving these propositions, I shall consider that I have made out my case; for I believe it to be altogether unnecessary to the present argument to prove that good inventions are beneficial to society, or to show that legislation is the best mode of encouraging them. I have asserted that society, by means of patent laws, obtains the benefit of inventions that would not otherwise be brought into use. It is obvious that under the patent laws as they exist, every one is as free to make his inventions public as he would be were those jaws done away with. If therefore I could show that only a few inventions are brought into use, besides those voluntarily made known, the preponderance of argument would be in favour of patents. It is no valid objection to this view that patents may be the means of causing inventions to be kept secret; because, as Mr. Denison has ably shown, it is almost *impossible* to keep an invention secret, using the term invention in the sense which I have attached to it. As we are discussing a matter of "*expediency*," it is no degradation to the argument to say, that by making invention a matter of personal interest to the inventor, he is more likely to develop his peculiar faculty than if he had no such inducement. That this agrees with facts I can assert from my own knowledge. A considerable amount of fallacious argument has been founded upon the supposition that the persons actually engaged in particular manufactures or employments are those who, as knowing most about the requirements of their respective occupations, originate the most useful inventions. Nothing can be more erroneous than this as the basis of an argument; yet the assertion has a sufficient amount of truth in it to make it available as a weapon in the hands of a skilful disputant. The manufacturer may be an inventor of improvements in the details of his business, and may be either capable of inventing, or willing

to adopt, processes tending to diminish the cost or improve the quality of the article which he produces; but it is quite clear that he would have no interest in putting forward an invention which might supersede his own productions, or so simplify them as to render them less profitable. Accordingly, the manufacturer in any line of business (unless he makes patenting a part of it) is not generally, nor even frequently, the inventor of things new and valuable, when tried by the tests of utility and economy to the general community.

There is another reason why persons specially engaged in particular employments are not the most likely to originate strikingly new and useful inventions, namely, that their ideas are confined by the traditions of their business. Accustomed by long habit to think that everything with which they have to do must be done in a certain manner, or fearing to risk a failure, or to derange their affairs by departing from established modes, such persons are the last, rather than the first, to adopt new discoveries, which in fact do not usually make their way through the medium of established agencies, but by the establishment of new ones. It is to the man of science, and the so-called "schemer," rather than to the established manufacturer, that we must look for really useful novelties in invention.

Of these two classes of inventors, I think I may fairly take Watt and Arkwright as examples. Watt—a man of good attainments in science, but employed as a mathematical instrument maker—went out of his own particular line of business to invent an important improvement in the steam engine. Arkwright—a barber by profession, and a schemer by choice—employed his leisure in inventing a spinning machine, which has been of incalculable benefit to the whole world. Both inventions were patented, and if both inventors realised princely fortunes by them, surely that society which has been so largely benefited has no right to grumble at its benefactors. This remark, however, is digressive. But it may be said that Watt and Arkwright would have invented all the same if there had been no such thing as patents. Can any one, however, who knows the difficulties that Watt had to contend with in getting his engine into use—that he and his partner expended an enormous sum before they realised any return whatever; and that Arkwright invested a large capital for five years without any profit;—can any one knowing this, assert that the Patent Laws which gave to Watt and Arkwright the opportunity and the encouragement to make a large outlay on their useful inventions, and to suffer much personal inconvenience, in the hope of obtaining a profitable return, were not the real and principal causes (next to the powers of the inventors themselves) of all the benefit which society has since derived from the use of their important inventions? It is morally certain that neither Watt nor Arkwright would have found a capitalist willing to embark his money, in order to bring out their inventions, without some such legal guarantee or security as that which is offered by the system of patents; and it is equally certain that without pecuniary assistance those inventions could not have been successfully introduced. The eagerness with which rival engineers and manufacturers pirated them when their utility had been practically demonstrated, does not prove that they would have taken them up if that utility had not been so demonstrated. I repeat, what I have already advanced, that the mere inventive idea is of small value compared with the practical application of it, for the same idea may occur to many minds, yet be of no public use whatever; until it occurs in a mind which is capable not only of conception but of application,

that is to say, in the mind of a *true* inventor, it is of no social utility; it is but the intellectual pastime of individuals. Had not Watt understood the practical value of the "condenser," and given up his time and energies to carry it into actual use, it might, like Hero's toy, have had no higher result than to furnish scientific amusement to select circles for an indefinite period.

Thus it will be seen that patents have, in *two* instances at least, induced inventors to devote their time and energies to the practical development of useful ideas, and enabled them to obtain the assistance without which that development could not well have taken place. These two cases are in their principal features types of a large class: if the conclusion at which I have arrived be true of the type, it is true also, with some allowances, for the whole class; and therefore it is *expedient* for society that it should give legislative encouragement to inventors, in order that it may obtain the benefit of inventions, that without encouragement would not be brought into use.

I have now to show that by Patent Laws society obtains the use of good inventions *sooner* than it would do in the absence of any such encouragement to inventors. This proposition is in fact little more than a part of the preceding one. I have given it separately, chiefly because it may appear to some persons, that to grant a monopoly of an invention for fourteen years, which is the form of "encouragement" provided by existing patent-laws, is not the method most likely to give to the public the earliest use of any invention. I grant that this supposition may be in a measure true; that there may be better methods of encouragement, but consequently, in endeavouring to show the advantage to society even of a fourteen years' monopoly to an individual inventor, I submit that I am coping with the most objectionable form in which patent-right can be presented. There is, perhaps, no instance in the history of patent-law that an opponent of my views would more readily advance against me than that of the patents granted to Arkwright for his invention. Arkwright was undoubtedly a "schemer,"—a man who set to work upon his invention with the hope of making a fortune by it, without any of that large benevolence which is so often attributed to the man of science, when he makes known his discoveries. Arkwright was not even the *first* inventor of the method of spinning which he brought into use, and as is well known, his patents were after a time set aside; in consequence of which the inventions came into general use sooner than they might have done, if the patents had held their ground. All this is true, but it does not weigh one grain against my position. Had not patent-laws existed, Arkwright would probably not have invented at all; certainly he would not have brought his invention into use so soon as he did, nor would he without a patent have obtained the pecuniary assistance which enabled him to prove the practicability of his invention, and to overcome the prejudices which had arisen from the failure of Paul and Wyatt, the inventors of spinning machinery, who had preceded him. Almost exactly the same argument may be applied to the circumstances of Watt's invention, and to other almost innumerable instances wherein self-interest has been the immediate **cause of the promulgation** of inventions. In short, the more strongly it can be made to appear a matter of personal interest to invent, the sooner inventions will be made, and the sooner will the public have the use of them. But the strongest argument in favour of my view is this, that no one is so likely to use the energy necessary to force an invention into use as the inventor

himself, to whom in most cases it appears more valuable, than it does to anybody else. Even if he should not have the means or the habits of business necessary to carry it into use himself, he will tell his tale till somebody listens to him who possesses those qualifications. Too often has the poor inventor found the fourteen years all too brief a period to induce the world to receive the fragment of truth which it has been his mission to promulgate, and which but for the hope of ultimate reward, he would long before have allowed quietly to pass into oblivion.

The Conservative feeling is so strong in society, that scarcely any other principle than personal advantage is sufficient to inspire the energy which shall triumphantly advance anything new, however good, in the face of existing interests, and the inertia of ignorance and indifference; and thus perhaps the very length of the period for which the inventor now obtains his monopoly, may be necessary to ensure his persistence for the length of time requisite to the development of his invention. Be this as it may, unless it can be distinctly shown that the manufacturer whose business it might interfere with—the man of science, who habitually sows pearls broadcast, or the amateur, who invents for amusement, would have more interest in bringing a good invention into speedy use than a man whose legally recognised business and personal advantage it may be to invent, and to bring inventions into use, I shall consider it proved that it is *expedient* for society to recognise and encourage the inventor, as such, whether he be man of science, manufacturer, amateur, or schemer, in order that it may have the benefit of good inventions *sooner* than it would otherwise obtain it.

I have done with argument for the present. Before I conclude this perhaps already too long epistle, I will venture to say a word or two on behalf of the much abused schemer;—the man who, because he sometimes happens to see a little farther than his neighbours, is complimented with the title of Visionary. It is not surprising that men who seldom or never travel beyond the ordinary curriculum of human learning, nor ever transcend the comparatively limited sphere of formalised knowledge, should ridicule the adventurer who strikes into the unknown, and who deals with influences and correlations which have not as yet been reduced to rules or scientific expressions. The poetry of invention has little charm for them; but the real man of science, who has a mind which uses its methods as implements, not allows them to become fetters, and who knows by experience how much there is that he does not know, should not—and I think seldom does, except from jealousy as to pecuniary advantages—quarrel with the successful inventor because he may not travel exactly by the same road as himself; nor should he call him by names calculated to bring him and his inventions into contempt.

No man can be a successful inventor without a course of laborious thought and observation. I am very incredulous as to accidental discoveries. There cannot be *many* such, if any, without the existence in the discoverer of a mind capable of appreciating the value of facts presented to it for the first time, and trained to reason upon the relations which they bear to others previously known. Even the humblest schemer, the intelligent workman, is a man to be encouraged and not decried; to be instructed, not put down, nor robbed of the fruit of his mental labours. The same argument which supports the case of manufacturers improving their respective productions or processes, by means of their special knowledge of them, holds good also for the working man, whose knowledge is equally special. That that know-

ledge is, in most cases, both as to master manufacturer, and workman, too special, is only a reason why they should be encouraged, instructed, and endued with the power of generalisation, so far as that power may be imparted or developed.

When science and special knowledge go hand in hand with inventive genius and the energy which self-interest inspires, then will the best results of invention be seen. The time is certainly coming, and indeed is already partly come, when the mere knowledge of what has been said and done in past ages must bow respectfully before the advancing influence of the true inventor—he who discovers social wants, and shows how they may be supplied in the most efficient manner, and with the least expenditure of means and labour; when the question will not be, “*Shall such a man be rewarded?*” but, “*In what way may society best testify its gratitude to one who is so obviously and so greatly its benefactor?*”

I am, Sir, faithfully yours,

Hastings, Sept. 6th, 1853.

J. R.

PATENTS.

Upnor Lodge, near Rochester,
18th September, 1853.

SIR,—I have read with great interest the several letters of your correspondents Messrs. Denison, Reveley, Cole, and a Member, on the subject of Patents: although each has advanced strong arguments in support of his opinions, none have suggested a plan to obviate the evil complained of or attempted to justify.

Permit me to offer a mode of preventing much litigation, and still secure the right of every honest inventor to protection from piracy, and the country as well as the individual from pecuniary loss, which points are the subjects of contention. If a Court were established for the *reward of merit*, to be composed of two practical engineers, two practical chemists, two clever draughtsmen, one experienced surgeon, one lawyer, two clever mechanics, two manufacturers of cotton or other fabrics, and two carpenters, with power to call in other assistants on particular occasions, these said persons to be fairly and liberally remunerated for their time and services, and be required to attend regularly at stated hours every week, at some office hereafter determined upon, the same Court to be made self-supporting after the following manner, I think it would go far to set the subject at rest.

Let every inventor have the right of depositing a written description or specification of his invention, on payment of five shillings at the time of leaving the same, sealed up; the said specification not to be opened unless a full quorum of the Court is present, and then to be read aloud in Court for all to hear, after which the said specification to be entered on the records or book kept for the purpose, and a further sum of five shillings paid for the entry. After the said copy is made, the Court shall examine previous patents and entries on the same subject, to ascertain whether the said invention be new or not, and if of opinion that it is not new, to acquaint applicant of the same, and refer him to the record, and allow him to read it on payment of one shilling, or to have a copy of the specification on payment of a sum fixed by scale. Every applicant shall be deemed the inventor who makes the first application, and having obtained a receipt from the Court that his specification is recorded, and a copy being handed to him thereof, the same shall take priority of every other like specification; in which case, the inventor shall be remunerated in the following manner. The Court shall grant licenses to every person who shall apply for them, on payment of

such reasonable sum hereafter fixed for the copy of the specification, and a further fixed sum per annum, according to the nature and utility of the said invention. And if another person shall improve substantially any invention so recorded, he shall receive such remuneration in the form of royalty or commission as the Court shall think him fairly entitled to, out of which licenses and royalty the Court shall receive a moiety, towards payment of salaries and other charges, and pay over the balance to the inventor. If any person should infringe or pirate the inventions recorded, the Court shall sue and prosecute him at its expense, and receive such damages, or payment for damages, as a jury shall award, so that the inventor shall be held harmless and free from all law expenses.

Supposing some such course as the above were adopted, it would give the inventor of every denomination a fair chance, whether he were rich or poor; it would protect him from litigation, spare him much anxiety and trouble, stimulate invention, benefit the country as well as the individual, prevent men of no talent from pirating the talented, set at rest endless disputes, and remove many obstacles to improvement. Allow me to add, I have had more than thirty years' experience in commercial matters in the City of London, that I know something of the effect of patents practically, and have witnessed the unblushing effrontery of many men claiming that which they have not the talent to invent, or understand when invented, and still have the reputation of being clever, from the appropriation of others' inventions.

I am, Sir, yours truly,

JOHN ROBERTS.

PATENTS.

SIR,—I would suggest to Mr. Denison, that the John Stuart Mill, quoted by Mr. Cole, is a “modern,” and the foremost logician in England, and not a contemporary of Jeremy Bentham, save that he was born during his, Mr. Bentham's, lifetime. Mr. Denison apparently confounds him with the elder Mill, Mr. James Mill, his father, the historian of British India. It is well to substantiate facts, if we cannot do so by opinions.

The name of Jeremy Bentham calls up that of his relative, Sir Samuel Bentham, one of our most original men, who was the originator of many public improvements that unscrupulous people have assumed to themselves, and built a repute upon, not having the fear of a patent registration before their eyes. It is scarcely in good taste to speak irreverently of Jeremy Bentham.

Mr. Denison quotes the opinions of Messrs. Tomlinson and Hobbs, in favour of the “originality and security of his lock,”—are these “arguments” or “dicta”?—and gives unpremeditatedly a most remarkable admission of his own—the impulse of truth overpowering the habitual caution of the pleader.

Mr. Denison, speaking of his lock, says:

“There can be no doubt that a patent for it might have been not merely taken out, but sustained and made profitable.”

This, then, sweeps away every shred of Mr. Denison's arguments, based on the score of patents being a nuisance to their owners, on account of the impossibility of maintaining them at law. By our legal opponent's own admission, it is possible, “to take out, sustain, and make profitable” a valid patent. If it can be so in one case, it can be so in one hundred, or one hundred thousand cases. Inventors ask no more. Mr. Denison's heart is better than his head, though, perhaps, he will not take this as a compliment. He bounces out with the truth under impulse, when he did not mean it. The

possibility of recompensing an inventor by a patent being admitted by this opposing champion, we have only to deal with the question of the advisability.

Another such admission, and the inventors will put Mr. Denison and his junior, Mr. Brunel, out of court; and possibly he may take the other side, and set to in earnest to show how the law may really accomplish, what, at present, it only pretends to accomplish.

To follow the ins and outs of irregular argument is not instructive. I will endeavour, with my first leisure, to set out categorically the argument of the inventor patentee.

I am, Sir,

Yours faithfully,

September 24th, 1853.

COSMOS.

LIGHTING.

Bristol Athenæum, Sept. 16th, 1853.

SIR,—Our Directors are now erecting a new and commodious building for the purposes of an Athenæum, and will feel greatly indebted to any of your readers who will communicate to them (directly or through the Journal), their views on the best mode of lighting the interiors of the lecture and reading rooms. The dimensions of the former are 62 ft. by 32 ft. 6 in., and 22 ft. high; the latter 55 ft. by 32 ft. 6 in., and 22 ft. high.

The ventilation has been well provided for, and the reading-room will be warmed by three open fire-places, in addition to hot air. Economy is desirable, but efficiency indispensable.

Yours faithfully,

EDW. HALSALL,

Hon. Sec.

PROCEEDINGS OF INSTITUTIONS.

DUNMOW.—The President, the Rev. C. L. Smith, commenced the lectures of the season at the Literary and Scientific Institution, choosing for his subject the various schemes for cutting a ship canal through the isthmus which connects North with South America. He showed the vast importance of such a work, and detailed the singular facilities which it would give to navigation. Though the idea of it had entered into the minds of Charles the Fifth of Spain, and William Pitt, of England, the work had been delayed by various circumstances, which he detailed. One prejudice against the attempt arose from the supposition that there was a great difference between the mean levels of the Atlantic and Pacific oceans, even Humboldt having estimated this difference at nine feet, whereas it was but two feet. The unhealthiness of Darien, which was hardly yet explored, had been greatly exaggerated, and would doubtless be much lessened by drainage and cultivation. He described the various routes proposed for the canal, viz.: 1. The Tehuantepec route; 2. That by Lake Nicaragua; 3. That from Chagres to Panama; 4. That from Carti to Chepo; 5. The Darien route, or that from Caledonia Bay, or Port Escoces, to the Gulf of San Miguel; and 6. That by the Atrato river to the Bay of Cupicá. Of all these the Darien route was the shortest but one, and was free from the great disadvantages which more or less beset all the others. The canal here would have noble natural harbours at either end, and would require no deep cuttings, and no locks; the river had no bar at its mouth, and need not be dammed nor dredged; the coasts were comparatively calm, and free from shoals, rocks, and kays; no volcanoes were near,

and earthquakes were unknown. Ships would pass either way in six hours with the ebb or flow of tide, running no chance of collision with each other; and the channel when once made, would be kept clean and deep by the continual movement of the sea. He next described the surrounding country, its inhabitants, its vegetable products, which were very magnificent, and its minerals. Lastly, he discussed the probability of the canal being worn into a strait, sufficiently wide to divert the Gulf-stream from the shores of Europe: in this case, the climate of Britain would be reduced to that of Kamtschatka, which lies between the same parallels of latitude; but such a catastrophe, if it ever occurred, could not be brought about in less than centuries of time. He concluded with hoping that this grand project might be speedily commenced, in order not only that the conveniences and luxuries of life might be augmented to us, but that all the blessings of civilization and religion might be spread among the now barbarous lands of the Southern seas.—Viscount Maynard, the Lord-lieutenant of the county, has most liberally given to the Literary and Scientific Institution, a site for a building; it is proposed to raise the capital required for its erection by shares.

EXETER.—The inauguration festival to celebrate the opening of the Royal Public Rooms, in this city, by the Exeter Literary Society, took place on Wednesday week. For some time past it had been found that the Athenæum, in which the Society had carried on its operations, was greatly inadequate to accommodate its numerous members. Various circumstances, however, prevented their removing into more extensive premises till recently, when the Royal Public Rooms having changed hands, they availed themselves of the opportunity of securing that eligible building for a term of years. Shortly after seven o'clock the chair was taken by the President of the Society, John Sillifant, Esq., who was supported on his right and left by Sir John Duckworth, Bart., M.P., Edward Divett, Esq., M.P.; the Right Worshipful the Mayor of Exeter (R. S. Cornish, Esq.); Sir Stafford Henry Northcote, Bart., C.B.; Sir John Kennaway, Bart.; R. Durant, Esq.; M. Kennaway, Esq.; Dr. Shapter; Dr. Miller; R. W. Fox, Esq., &c., &c. The CHAIRMAN observed that he was glad that their occupation of the noble room they were now assembled in had been adjourned to a period when he could point to the medallions on the walls, and tell them that a working-man, who was amongst the first originators of the Society, had exhibited his art in those productions; and further, that a painting which adorned the walls—a copy of a group by Ansdell—proceeded from the pencil of a working mason, a member of their Society. He reminded the members that they must not depend upon lectures alone, but that they should in the library and in the class-room prepare their minds to receive the benefits which the lectures were intended to confer. It was in vain to use the purest and richest seed unless the ground was cleansed and cultivated, and that must depend upon the exertion of each individual member. Mr. DIVETT, M.P., and Sir J. T. B. DUCKWORTH, Bart., M.P., next addressed the meeting; after which Sir STAFFORD NORTHCOTE, Bart., rose and said that he was particularly glad to see that the time was passing away when there was any jealousy on the part of those who had received a liberal education, of that education being communicated to the whole mass of the people. Time was when people looked upon the possession of certain exclusive information, certain mysteries of their craft, as the means of success, but that time had passed away. In conclusion, he earnestly hoped they would

never entertain the idea that England was to be regenerated either by Mechanics' Institutes, or Literary Societies. The only way in which England was to be regenerated, was by each man's considering the great work which was before him—in perfecting his own nature, in bringing himself to that perfection to which God had destined him. The meeting was afterwards addressed by Mr. Kennaway, Dr. Shapter, the Right Worshipful the Mayor, and Sir John Kennaway, Bart.

YEovil.—At a Committee Meeting of the Mutual Improvement Society, on Wednesday, the 7th instant, the thanks of the meeting were given to Mr. J. D. Williams, (one of the founders of the Institution, and who for a period of upwards of six years had acted as Honorary Secretary), for his past services, Mr. Williams having resigned the above office; the efficient discharge of the duties of which, had greatly promoted the interests of the Society. Mr. Charles Vining was elected Secretary, and Mr. Richard Manning, Assistant Secretary.

TO CORRESPONDENTS.

Chimney-sweeping Machine.—"Can any of your readers inform me which Chimney-sweeping machine is esteemed the best, and where it is to be obtained?—A. T."

Lectures.—It is particularly requested that the Secretaries of Institutions will have the goodness to forward to the Secretary of the Society of Arts, as early as possible, two copies of the Programme of the Course of Lectures to be delivered during the ensuing Session at their respective Institutions.

MISCELLANEA.

LIVERPOOL PUBLIC LIBRARY.—At a Meeting of the Liverpool Town Council, on Wednesday, the Mayor (Samuel Holme, Esq.), stated that William Brown, Esq., M.P. for South Lancashire, had offered to present the town with a sum of 6,000*l.* for the erection of a building for a public library.

INDUSTRIAL EDUCATION.—The September number of the *Dublin University Magazine*, writing on this subject, says, "We would by no means set up the foreign industrial institutions as models to be exactly followed. The scheme of instruction given at most of them is far too general to suit our own views. We would, in our industrial education, hardly have anything taught for which there already exists a complete machinery of instruction elsewhere. All languages and general literature, and all pure mathematics and theoretical science, whether physical or metaphysical, should be excluded from our course of instruction. We would require a certain elementary amount of these to be already possessed by the pupils before they entered on a course of industrial education, and we would have every facility afforded for their going on with these branches of education elsewhere, while they were receiving practical instruction in the industrial schools. The object of our industrial institutions should not be to rival any existing educational establishments, but to add to them a kind of instruction which they do not give. As to those branches of physical science which are already taught in our existing educational establishments, such as chemistry, geology, and mechanics; while we would, by all means, urge their being continued to be taught there as parts of general science, and portions of that mass of information necessary for a liberal education, they should, in our industrial schools, be the main objects of instruction, and taught not simply as sciences desirable to be known, but as useful to be practised. These and other kindred sciences should be taught in all their entirety, and followed into all their branches; their elements and principles should be drilled into the pupils' minds as the very A B C of their education; and every one of their possible practical applications should, as far as possible, be carried out under the pupil's eye, and, when possible, by his own hands."

NEW STEAM-SHIP.—Messrs. Scott Russell, and Co. have the contract to build for the Eastern Steam Navi-

gation Company the largest ship ever heard of in the world, which is to carry sufficient fuel for the entire voyage to and from India or Australia. Her length is to be 680 feet; breadth, 83 feet; depth, 58 feet, with screw and paddle engines of aggregate nominal horse-power of 2,600. In addition to taking from 4,000 to 6,000 tons of coals, she will be able to carry 5,000 tons measurement of merchandise, and will have 500 cabins for passengers of the highest class, with ample space for poops and lower class passengers. The whole of her bottom, and up to six feet above the waterline will be double and of a cellular construction, so that any external injury will not affect the tightness or safety of the ship. The upper deck will also be strengthened on the same principle, so that the ship will be a complete beam, similar to the tube of the Britannia bridge. It will be divided into 10 separate water-tight compartments. She will have separate sets of engines, each with several cylinders; and separate boilers will be applied to work the screw, distinct from those working the paddle-wheels, so that, in the event of temporary or even permanent derangement of any one of the engines, or of either the paddle-wheels or the screw, the other engines and propellers would still be available. It is computed that her great length will enable her to pass through the water at the velocity of 15 knots an hour, and by the great speed, combined with the absence of stoppages for coaling, the voyage between England and India, *via* the Cape, may be accomplished in 30 or 33 days, and between England and Australia in 33 or 36 days. It is said that the ship will become, by its construction, a beam of sufficient strength to meet any strain to which it can be subjected, and will consist of so many distinct compartments that no local injury, however serious, will affect its buoyancy to any dangerous extent.

MR. TITUS SALT'S MILL, BRADFORD.—It will, doubtless, be remembered by many of the members of this Society, that during the year 1852, a drawing was exhibited of a mill then in course of erection for Mr. Titus Salt, of Bradford. On Tuesday last, the opening of the mill was celebrated. The event excited great interest in the West Riding, the undertaking being one of unusual magnitude—the amount of money embarked in the undertaking being something like a quarter of a million. The works, which consist of a mill, combing and weaving sheds, warehouses, &c., are upon the best construction, and are intended for the carrying on of the manufacture of alpaca and mohair fabrics upon a most extensive scale. The engines put down are nominally of 400 horse-power, but may be worked so as to be equal to 1,200 horse-power; the shafting for putting the machinery into motion is nearly two miles in length. The weaving shed will contain 1,200 looms, capable of weaving 30,000 yards of alpaca or mixed cloth fabrics per day, or nearly eighteen miles in length, or 5,616 miles per annum. The area appropriated to the buildings is computed at six acres, while the several floors in the mills, warehouse, and sheds, form a superficies of 55,600 yards, or 11½ acres. The mill, which runs from east to west, is 550 feet in length. It includes six stories, and is constructed of massive stone-work in the boldest style of Italian architecture. The floors are formed on arches of hollow brick, made on the ground by Clayton's patent process; the openings in the bricks being used for the purposes of ventilation. Rows of ornamental cast-iron columns and massive cast-iron beams support the arches. The roof is of iron. The windows, of large size, are filled with immense squares of cast plate-glass. The whole of the building is fire-proof.

LIQUID INDIA-RUBBER.—A correspondent of a New York paper, writing from Para, in Brazil says: "There is a method in preparing the gum, which has recently been patented, and which differs essentially from the usual curdling. The milk, as drawn from the tree, is bottled in large glass bottles and demijohns; a preparation of some chemical nature, which is a secret, is mixed with the milk, and the bottles are securely sealed. In this way the gum is sent to the United States. It curdles twenty-four hours after exposure to the air, and forms a pure, white, solid, and remarkably strong rubber. There is only one house in Para which has the secret of this receipt, as I learn, and a member of the firm gives his personal attention to the preparation of the article, some thousand miles in the interior of the country. The proprietors of the patent—as they say in Para—have a

contract from an American manufacturer to take all they can furnish at 1 dol. 50 c. per pound, and he uses it all up in making suspenders, garters, &c. The ordinary rubber is gathered by Indians in the dry season, and is exchanged by them for the common whiskey of the country, and quite a pleasant beverage, cloths, and implements for extracting the milk. The merchants at Para buy it from second and third hands in preference to extracting it themselves, as they find that the Indians work better when hunting on their own account than when operating for employment."

LICHENS AS A PROTECTION TO BUILDINGS.—The Commissioners of 1839 for selecting stone for the New Houses of Parliament, referred in their report to a point which ought, perhaps, to be kept in view when comparing buildings—namely, an advantage which buildings in this country appear to possess over those in populous and smoky towns, owing to the lichens with which they become covered in such situations, and which, when firmly established over their entire surface, seem to exercise a protective influence against the causes of decomposition. As an instance of the difference in degree of durability in the same material subjected to the effects of the atmosphere in town and country, they point to the frustra of columns and other blocks of stone quarried at the time of the erection of St. Paul's Cathedral, and now lying in the island of Portland. These are covered with lichens, and though they have been exposed to all the vicissitudes of a marine atmosphere for more than 150 years, exhibit their original form even to the marks of the chisel; "while the stone which was taken from the same quarries (selected, no doubt, with equal, if not greater, care than the blocks alluded to), and placed in the cathedral itself, is, in those parts which are exposed to the south and south-west winds, found in some instances to be fast mouldering away." This, perhaps, was not altogether to be expected; because it might have been argued, that as the lichens were calculated to retain a certain amount of moisture on the surface of the stone, a contrary effect would result from their presence.—*The Builder*.

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 16th September, 1853.

Dated 26th March, 1853.

727. A. Prince, 4, Trafalgar-square—Carriages. (A communication.)

Dated 9th August.

1855. W. Baines, Coverdale-terrace, Birmingham—Railways.

Dated 12th August.

1859. T. Allan, Adelphi-terrace—Electric conductors and insulation.

Dated 15th August.

1907. J. L. Talabot, 57, Chaussée d'Antin, Paris, and J. D. M. Stirling, The Larches, near Birmingham—Cast steel.

Dated 25th August.

1978. J. Shaw and J. Steinthal, Manchester—Artificial manure.

Dated 1st September.

2026. J. Macintosh, 12, Pall-mall—Breakwater.
2027. R. Oxland, Plymouth—Manure.

Dated 2nd September.

2028. J. Hinks, G. Wells, and F. Dowler, Birmingham—Machinery for metallic pens.
2029. J. Taylor, Manchester, J. Griffiths, Wolverhampton, and T. Lees, Stockport—Steam-boilers.
230. B. Auric, 16, Castle-street, Holborn—Application of sulphate of lime to mosaics, and process of colouring the same.
2031. J. P. Pritchett, jun., York—Window-sashes and shutters.
2032. Dr. A. Carosio, Connaught-square—Power by electric currents.
2033. J. and T. Sibley, Ashton-under-Lyne—Machinery for cutting discs out of metal and other plates.

Dated 3rd September.

2034. W. Ashton, Manchester, and W. B. Harvey, Salford—Machinery for braid.
2035. J. T. Jewiss and D. Jewiss, Horsleydown—Furnaces.
2036. E. Dobell, Hastings—Clocks and timekeepers.
2037. T. Walker, Birmingham—Rotary engines by steam, &c.

2038. A. Nagles, Ghent—Machinery for washing, bleaching, &c.
2039. G. Stickney, Hanover-street, Pimlico—A blower. (A communication.)
2040. G. Stickney, Hanover street, Pimlico—Machinery for forging metals. (A communication.)

Dated 5th September.

2041. J. Doyle, 17, Cambridge-street, Paddington—Water-proofing boots and shoes.
2043. J. Smalley, Bishopgate, Wigan, and W. Smirk, Ince, Wigan—Railway carriage-axles.
2044. J. H. Johnson, 47, Lincoln's-inn Fields—Stays. (A communication.)
2045. W. E. Newton, 66, Chancery-lane—Machinery for terry fabrics. (A communication.)
2046. W. E. Newton, 66, Chancery-lane—Breach-loading guns. (A communication.)

Dated 6th September.

2047. T. B. Uppill and W. Brown, Birmingham—Metallic bedsteads, &c.
2048. L. W. Wright, Charlford, Gloucester—Reaping-machines.
2049. A. Calles, Southwark-square—Manufacture of typographic characters.
2050. J. Kerfoot, Lower Darwen, Lancashire—Spinning machinery.
2051. H. Wilkinson, Brass-foundry, Tottenham-mews—Air furnaces.
2052. J. Davis and R. Ramsay, Low Furness Iron-works, Ulverstone—Steam, air, and water engine.
2053. T. Pope and E. Bufton, Birmingham—"Buffalo buttons."

Dated 7th September.

2055. J. Smith and A. Somerville, Birmingham—Metallic pens and holders.
2056. J. Alsop, Huddersfield, and E. Fairburn, Kirkstall-mills, Mirfield, Yorkshire—Baking bread.
2057. J. G. Fletcher and W. Peel, Accrington—Looms.
2058. D. Law and J. Inglis, Glasgow—Moulding and shaping metals.
2059. W. J. Smith, Stretford, Lancashire—Buttons.
2060. W. Grimshaw and Ellis Rowland Morsley, Antrim—Bricks.
2061. G. E. Ashton, Middlesex—Converting refuse materials into yarn, &c.
2062. B. Hustwayte, Hockley-street, Homerton, and R. J. P. Gibson, Upper Brunswick-street, Hackney—Composition for bricks, tiles, &c.

WEEKLY LIST OF PATENTS SEALED.

Sealed 12th September, 1853.

625. Nicolas Auguste Eugene Millon and Leopold Mouren, of Algiers—Improvements in the treatment of corn and other grains, and more especially in all that concerns washing, drying, grinding, curing, and preserving them.

Sealed 13th September.

642. William Morgan, of Spencer-street, Shoreditch—Manufacture of a portable double-action folding chair.
665. Paul Cameron, of Glasgow—Improvements in marine and surveying compasses.
671. John Haskett, of Wigmore street—Improvements in grinding stones and whetstones. (A communication.)
682. Henry Bousquet, of Fenchurch-street—Improvements in the manufacture of manure.
706. John Henry Park and Joseph Park, of Preston—Improvements in water-closets.
782. Robert Evans Peterson, of Tottenham Court-road—Invention of an improved piston. (A communication.)
1692. Isaac Taylor, of Stanford Rivers, Essex—Improvements in machinery for printing.
1716. Moses Poole, of Avenue-road, Regent's-park—Improvements in gas regulators. (A communication.)
1718. James Shield Norton and Henry Jules Borie, of Union-works, New Park-street, Southwark—Improvements in the manufacture of tiles and stairs from plastic materials.
1730. Alexander Isaac Austen, of Trinity-place, Wandsworth-road—Improvements in the apparatus used in the manufacture of mould candles.
1734. Mary Ann Rylands, of Kingston-upon-Hull—Improvements in yards and spars of ships and other vessels. (A communication.)
1752. Alfred Vincent Newton, of Chancery-lane—Improved manufacture of cutting-tools. (A communication.)
1760. Joseph Barrans, of Peckham-lane, Deptford—Improvements in steam-boilers.
1762. Lansing E. Hopkins, of New York—Manufacture of hat-bodies of fur and other like substances.

Sealed 17th September.

673. Charles Harratt, of Royal Exchange-buildings—Improvements in strengthening the masts of ships and vessels.
687. James Fraser, of Gracechurch street—Improvements in the manufacture of portable packages.